Some Mathematical Problems in Elastography

(Day 5 - Talk 1)

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Elastography is a medical imaging modality aiming to reconstruct the elastic properties of biological tissues. In ultrasound elastography, the displacements generated by propagating shear waves are measured by ultrasound. A first inverse problem consists of reconstructing such displacement maps from the ultrasound echos. I will present a mathematical modeling and theoretical and numerical results for such a problem. Once displacements are obtained, a second inverse problem consists of reconstructing quantitative estimates of the elastic properties of tissues. I will present a general mathematical framework for such an inverse problem and related hybrid inverse problem.